Question
Suppose that a r.v. X has the following probability mass function (pmf):

$$f(x) = \begin{cases} cx, & \text{for } x = 1, 2, 3, 4, 5; \\ 0, & \text{otherwise} \end{cases}$$

Determine the value of the constant c. Sketch the pmf of X and find the following probabilities:

$$P\{X < 1\},\ P\{-1 < X < 3\},\ P\{X > 1\}$$

Answer
From "the total probability is one",

$$\sum_{i=1}^{5} ci = 1$$

and so $c = \frac{1}{15}$. Consequently

$$P\{X = 1\} = 0,$$
$$P\{-1 < X < 3\} = P\{X = 1\} + P\{X = 2\} = \frac{1}{5}$$
$$P\{X > 1\} = 1 - P\{X = 1\} = \frac{14}{15}$$